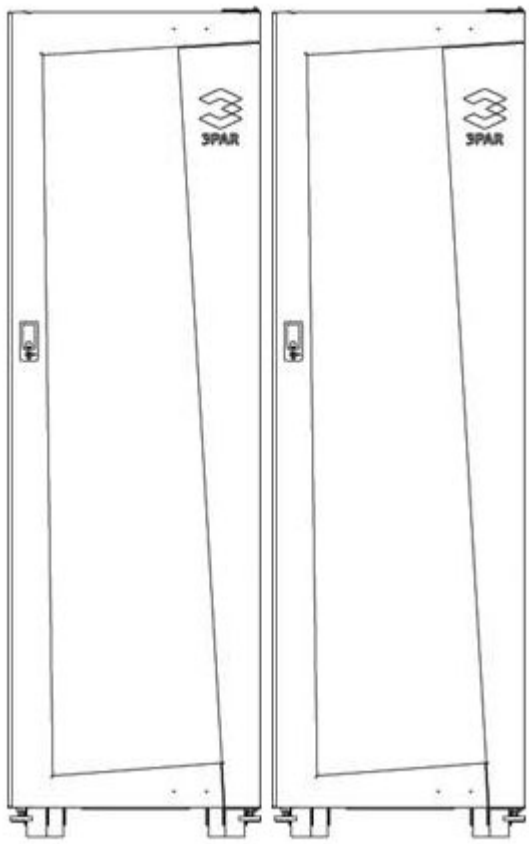
Overview

With the introduction of the HP 3PAR StoreServ 10000 Storage with Thin Built In™, HP 3PAR remains the first storage vendor to incorporate thin capabilities into array hardware. The two new HP 3PAR® Gen4 ASIC in each HP 3PAR StoreServ 10000 Controller Node provides hyper-efficient, silicon-based engines that drive simple, on-the-fly storage optimizations to maximize capacity utilization while delivering high service levels. The revolutionary innovations of HP 3PAR StoreServ 10000 Storage make it the heir to HP 3PAR T-Class Storage.



HP 3PAR StoreServ 10000 Storage

What's New

- New design cabinets that support HP Standard three phase PDUs
- Increase in maximum raw capacity supported in the HP 3PAR StoreServ 10000 Storage:
  - 1.1 PB on HP 3PAR StoreServ 10400
  - 2.2 PB on HP 3PAR StoreServ 10800
- New 400GB MLC SSD drives in HP 3PAR StoreServ 10000 Storage
- Data-At-Rest encryption with self-encrypting drives on HP 3PAR StoreServ 10000 Storage
- HP 3PAR StoreServ File Controller

Overview

Summary	Block Storage		File Storage
	10400	10800	HP StoreServ File Controller[13]
Number of Controller Nodes	2 or 4	2, 4, 6, or 8	Upto 8
HP 3PAR Gen4 ASICs	4 or 8	4, 8, 12 or 16	Not Applicable
Management Processors	4 - 8 Quad-Core 2.83 GHz	4 - 16 Quad-Core 2.83 GHz	1 - 16 four-core 2.4 GHz
Total Cache	96 - 192 GB	192 - 768 GB	None
Control Cache	32 - 64 GB	64 - 256 GB	None
Data Cache	64 - 128 GB	128 - 512 GB	None
Maximum Host Ports	96 ports	192 ports	4 - 128
Fibre Channel Host Ports[1]	0 - 96 ports	0 - 192 ports	Not Applicable
10Gb/s iSCSI Host Ports[10]	0 - 16 ports	0 - 32 ports	Not Applicable
1GbE/10GbE Network Ports	Not Applicable	Not Applicable	4 - 128
Built-in Remote Copy (RCIP) Ports[11]	2 - 4 ports	2 - 8 ports	None
Number of Drives	16[2] - 960 drives	16[2] - 1,920 drives	2
Raw Capacity (approx.)[3]	4.84 - 1100 TB[4]	4.84 - 2200 TB[4]	2x450GB for O/S mirror

Capacity Details			
RAID Levels	RAID 0, 1, 5, MP[5]	RAID 0, 1, 5, MP[5]	RAID 0, 1, 5, 6[12]
RAID 5 Data to Parity Ratios	2:1 - 8:1	2:1 - 8:1	2:1 - 8:1[12]
RAID 6 Data to Parity Ratios	6:2, 14:2	6:2, 14:2	6:2, 14:2[12]
Drive Capacities (approximate GB[4]) (RAID levels, parity ratios, and drive capacities all mixable within the same Storage System)	100 SSD[6], 200 SSD[6],400 SSD[6], 300 FC, 600 FC, 300 SAS[7], 450 SAS[7], 900 SAS[7], 2000 SAS[7], 1000 NL[8], 2000 NL[8]	100 SSD[6], 200 SSD[6],400 SSD[6] 300 FC, 600 FC, 300 SAS[7], 450 SAS[7], 900 SAS[7], 2000 SAS[7], 1000 NL[8], 2000 NL[8]	Not Applicable
Number of Drive Chassis (Each Drive Chassis holds up to 40 drives in 4U)	2[8] - 24 chassis	2[8] - 48 chassis	Not Applicable

NOTE: Support for SAS drives on HP 3PAR StoreServ 10000 Storage is currently available with HP 3PAR OS version 3.1.2 only. SAS drive support for HP 3PAR OS 3.1.1 will be available in the future. SAS drives are not compatible with prior versions of the HP 3PAR OS.

1 Each port is full bandwidth 8 Gbit/s Fibre Channel capable
2 Recommended minimum is 32 drives which results in a 9.6 TB minimum raw capacity.
3 Maximum raw capacity currently supported with any and all drive types
4 For storage capacity, 1 GB = 1,024,000,000 bytes and 1 TB = 1,000 GB
5 RAID MP is HP 3PAR Fast RAID 6 Technology
6 SSDs are Solid State Drives
7 SAS drives are Serial Access SCSI Drives
8 NL drives are Nearline (7.2k) disks
9 Recommended minimum is 4 drive chassis per pair of controller nodes

Overview

10 Each port is full bandwidth 10 Gbit/s iSCSI capable
11 Two built-in 1-GbE RCIP ports per node pair; maximum of 8 usable; RCFC works out of the FC Host ports
12 Applies to the array storage assigned to 3PAR StoreServ File Controller for file services
13 For details, please refer to the 3PAR StoreServ File Controller section in this document.
NOTE: Specifications are subject to change without notice.

Host OS Support

Citrix® XenServer® | HP-UX® | IBM® AIX®

Microsoft® Windows® Server, including Microsoft® Hyper-V™

OpenVMS* | Oracle® Linux® (UEK and RHEL compatible kernels) | Oracle® Solaris

Red Hat® Enterprise Linux® | Red Hat® Enterprise Virtualization

SUSE® Linux® Enterprise | VMware vSphere™

* Registered Release

For latest information on supported operating systems refer to Single Point of Connectivity Knowledge for HP Storage Products (SPOCK): http://www.hp.com/storage/spock

Features

Get Thin and Stay Thin

The revolutionary, zero-detect capable HP 3PAR Gen4 ASIC is a hyper-efficient storage optimization engine designed to power "fat-to-thin" volume conversions in silicon while preserving superior performance levels. Fat-to-thin volume conversions boost capacity utilization by removing allocated but unused space from traditional, "fat" storage volumes.

With the HP 3PAR Gen4 ASIC's built-in, hardware-based zero-detection capabilities, migration of "fat" volumes from other storage platforms to new "thin" volumes on HP 3PAR Storage is achieved with the greatest speed possible and without the application disruption of software-based implementations. The HP 3PAR Gen4 ASIC's enables the automatic migration of data from sparsely used pages to enable 128MB regions to be reclaimed for re-use by other volumes. With conversions taking place at the hardware level, more parallel memory transactions are possible and system performance is not impacted like it is with software-based approaches to volume optimization. Thin Built In capabilities within HP 3PAR StoreServ 10000 Storage also power the ongoing, automated optimization of thin provisioned volumes on HP 3PAR Storage, so thin volumes stay thin.

Building Block for Cloud Computing

Building a converged infrastructure to support cloud and self-service computing models requires a high degree of virtualization that places new demands on storage. With their distinct architectural advantages, thin hardware capabilities, and superior performance, HP 3PAR P10000 Storage is purpose-built to meet the demands of highly virtualized environments. HP 3PAR P10000 Storage gives enterprises and service providers the agility to respond quickly to changing business needs while maintaining the resiliency that "always-on" businesses demand.

Start Thin. HP 3PAR Thin Provisioning Software

HP 3PAR Thin Provisioning Software improves storage system efficiency and optimizes capacity utilization system-wide. It does this by addressing the problem of capacity over-allocation through eliminating the need to dedicate storage capacity on a per-application basis. Since its introduction, HP 3PAR Thin Provisioning Software has given HP 3PAR Storage clients the ability to meet Green IT targets and reduce capacity purchases. Thin Provisioning makes this possible by cutting SAN costs, floor space requirements, and energy expenses by up to 75% and decreasing administration time by up to 90%. It does this by allowing organizations to purchase only the disk capacity they actually need, only as they actually need it through eliminating the need for up-front capacity allocation and dedicating resources to individual applications. This prevents clients from paying to power, house, and cool disks that they may not need for months or years to come, or may never actually need.

Get Thin. HP 3PAR Thin Conversion Software

With HP 3PAR Thin Conversion Software, a technology refresh no longer requires a terabyte-for-terabyte replacement, but instead offers the opportunity to eliminate 70-80% of the legacy capacity in a client's storage environment, simply and rapidly. Leveraging the zero-detection capability built into the HP 3PAR ASIC, the new Gen4 ASIC combined with HP 3PAR Thin Conversion Software, still effectively and rapidly "thin" a heterogeneous data center to one-quarter of its original size or less while preserving service levels, and without impacting production workloads. The new ASIC enables the automatic migration of data from sparsely used pages to enable 128MB regions to be reclaimed for re-use by other volumes, driving efficient use of space beyond what was available with the Gen3 ASIC. This solution not only makes a technology refresh more affordable, but it reduces up-front capital costs as well as ongoing operational and environmental costs associated with powering, cooling, and housing storage equipment. It also provides space and power consumption relief for data centers approaching maximum density.

In an ideal world, all storage volumes would start thin using HP 3PAR Thin Provisioning Software. But in some cases, starting thin has not been an option, particularly when it comes to data stored on legacy arrays from traditional storage vendors. HP 3PAR Thin Conversion Software uses a virtualization mapping engine for space reclamation called the HP 3PAR Thin Engine, together with the unique hardware capabilities of the HP 3PAR Gen4 ASIC to extend the benefits of thin provisioning to existing storage volumes. In tandem with the HP 3PAR Gen4 ASIC, Thin Conversion enables inline, wire speed "fat-to-thin" conversions compatible with any host volume. HP 3PAR Utility Storage is the only storage platform to offer this built-in, hardware-accelerated, fat-to-thin conversion capability. With HP 3PAR Thin Conversion Software, clients can rapidly and non-disruptively shrink storage footprint, reduce storage TCO, and meet Green IT targets.

Stay Thin. HP 3PAR Thin Persistence Software and Thin Copy Reclamation

To realize the ultimate efficiency and cost-saving benefits of starting thin or getting thin, storage also needs to stay thin. An industry first, HP 3PAR Thin Persistence Software ensures that thin volumes on the array stay as lean and efficient as possible. Thin Persistence Software accomplishes this by using the HP 3PAR Thin Engine with the system's built-in zero-detect capability to reclaim unused space associated with deleted data. With Thin Persistence, space reclamation on HP 3PAR arrays takes place simply, quickly, and without disruption to production workloads.

Thin Copy Reclamation is an HP 3PAR Operating System Software feature that performs a similar function to HP 3PAR Thin Persistence Software, but uses the HP 3PAR Thin Engine to reclaim unused space from thin copies (virtual copy snapshots and remote copies) rather than thin volumes.

On average, HP 3PAR Storage clients already purchase 60% less capacity than with traditional storage arrays. With HP 3PAR Thin Persistence and Thin Copy Reclamation, customers can improve this average capacity savings by another 10% for a total savings of up to 70%. Volumes and snapshots can now stay thin to help sustain Green IT targets, defer the cost of purchasing raw capacity to handle new data growth, and keep costs down without the need to purchase special host-based software or retaining professional

services.

HP 3PAR Peer Motion Software

HP 3PAR Peer Motion Software is a non-disruptive, do-it-yourself data migration tool for enterprise Storage Area Networks. With Peer Motion, HP 3PAR Storage customers can load balance I/O workloads across systems at will, perform technology refresh seamlessly, cost-optimize asset lifecycle management, and lower technology refresh capital expenditure. Unlike traditional block migration approaches, Peer Motion enables customers to migrate storage volumes between any HP 3PAR Storage online, non-disruptively, and without complex planning or dependency on extra tools. Peer Motion leverages HP 3PAR Thin Built In™ technology to power the simple and rapid conversion of inefficient, "fat" volumes on source arrays to more efficient, higher-utilization "thin" volumes on the destination HP 3PAR Storage.. Peer Motion Manager is an add-on application that orchestrates all stages of the data migration lifecycle to ensure data migration is simple and fool-proof.

HP 3PAR StoreServ Data Encryption

The HP 3PAR StoreServ Data Encryption enables the encryption for all the data that is stored on the internal drives of the 3PAR StoreServ Storage. The 3PAR StoreServ Data Encryption solution encrypts and decrypts all data written to and read from the media automatically. The 3PAR StoreServ Data Encryption solution encrypts the data so that data cannot be read off a drive that is removed from the 3PAR Storage. In the event of a failure of the drive or the theft of a drive, the proper authentication key is required to be entered to gain access to the data stored within the drive. This method of encryption allows the user the comfort knowing all data contained on the drive is protected against internal and external risks

HP Storage Management Pack for Microsoft System Center

The HP Management Pack for Systems Center Operations Manager provides seamless integration with Microsoft Systems Center Operations Manager and now System Center Essentials by integrating predefined discovery and state monitoring policies, event processing rules and tasks, and diagram and topology views for the storage system.

For more information:
http://h18000.www1.hp.com/products/quickspecs/14249_div/14249_div.html

HP Storage Management Pack can be downloaded free from the following website:
https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=SCOM

Service and Support, HP Care Pack, and Warranty Information

Warranty

3 Year, On-site Warranty Service. 7x24 4-hour remote response with next business day on-site response

HP warrants only that the Software media will be free of physical defects for a period of ninety (90) days from delivery.

For more information about HP's Global Limited Warranty and Technical Support, visit:
http://www.hp.com/products/storageworks/warranty

Service and Support

Technology Services for increased uptime, productivity and ROI
TRUST HP storage technology experts for every level of service and support. Our integrated portfolio of Services for storage help customers reduce costs, optimize data, streamline storage management, and improve backup and recovery. Capitalizing on HP Storage Systems' capabilities requires a service partner who understands your increasingly complex environment. Team with the people who know HP infrastructure hardware and software best-the experienced professionals at HP Services.

Protect your business beyond warranty
Warranty protects against manufacturer defects, however warranty uplifts, such as HP Care Pack Services protect the business-by reducing downtime risks and providing operational consistency for mission-critical and standard business computing.

NOTE: SSDs have a limited number of writes that can occur before reaching the SSD's write endurance limit. This limit is generally high enough so wear out will not occur during the expected service life of an HP 3PAR StoreServ under the great majority of configurations, IO patterns, and workloads. HP 3PAR StoreServ tracks all writes to SSDs and can report the percent of the total write endurance limit that has been used. This allows any SSD approaching the write endurance limit to be proactively replaced before they are automatically spared out. An SSD has reached the maximum usage limit once it exceeds its write endurance limit. Following the product warranty period, SSDs that have exceeded the maximum usage limit will not be repaired or replaced under HP support contracts.

What HP Storage Technology Services can do for you
HP Storage Technology Services can help you design, deploy, test, integrate, support, and manage IT and infrastructure solutions. HP storage lifecycle support services offers a full spectrum of customer care-from technology support to complex migrations to complete managed services.

Choose the right level of support, deployment and integration services
HP support recommendations are designed to help you enhance technology operations and lower risk-and make it easier for you to seek the right balance between affordability and service-level commitments. Depending on your individual support needs, choose from three levels of care that cover the entire lifecycle to better address your needs-Optimized Care, Standard Care, and Basic Care. If none of our support recommendations meet your needs, we can tailor a service solution for your unique support requirements. Only HP brings together deep expertise, proactive and business critical support and a strong partner network-plus, a full set of infrastructure services designed to power a Converged Infrastructure.

Optimized Care - delivers best performance and stability through deployment and proactive management practices

HP Critical Service-Designed for environments where downtime cannot be tolerated, HP monitors your environment around-the-clock, 365 days a year. We implement improvement projects to mitigate risks and reduce incidents. If outages do occur, they are addressed immediately with access to our dedicated critical support escalation resources.
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA0-1613ENW.pdf

Standard Care - maintains high level of uptime, along with expert help to cut the cost and complexity of implementation and support	HP Proactive 24 Service-This is the right choice for environments where some downtime is acceptable. HP helps manage your IT environment for improved performance, stability, and availability. Your incidents are addressed 24x7, with a maximum 4-hour onsite response 365 days a year. http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9842EN.pdf
Basic Care - Minimum recommended support	3-Year HP Support Plus 24-This service provides support for environments where some downtime is expected. HP provides around-the-clock hardware and software support onsite, including third-party support. We also provide cost-saving software updates and monitor ongoing operations through the latest remote tools. http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EN.pdf
Implement right from the start	**Whichever level of care you select, it includes**: **HP 3PAR Storage Installation and Startup Service** - HP installs and tests your hardware and software onsite, including configuration. We deliver a custom tailored storage deployment, properly integrated into your environment. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-2345ENW.pdf
3PAR Remote Support Tools	**Support Recommendations include fully integrated remote supported** - core design and fabric of 3PAR industry benchmark remote support systems. Site-specific data used both proactively and reactively with real-time monitoring and information extraction tools. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-4141ENW.pdf
Additional services to meet your needs	**HP Storage Data Migration** - Proven expertise and tools help you migrate data across your data center or around the globe. http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-4107EN.pdf **HP Enhanced Implementation Service for SANs** - HP delivers complete design and implementation services for Fibre Channel, FCoE, FCIP, SAS, and iSCSI SAN connectivity components. http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-8527EN.pdf **HP 3PAR Storage Assessment Service** - We offer customized technical and operational guidance for an HP 3PAR Storage infrastructure, along with recommendations to help improve availability levels and ongoing environment management. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-2346ENW.pdf **HP QuickStart Service for HP 3PAR Storage** - Choose the most effective, appropriate methods for configuring and migrating to a HP 3PAR platform. http://www8.hp.com/us/en/services/services-detail.html?compURI=tcm:245-826727&pageTitle=Consulting-Services&contentView=business
For more information	www.hp.com/services/storage To learn more on HP Storage Services, please contact your HP sales representative or HP Authorized Channel Partner **HP Care Pack Services are sold by HP and HP Authorized Service Partners**: ● Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools. ● Customers purchasing from a commercial reseller can find HP Care Pack Services at:

Service and Support, HP Care Pack, and Warranty Information

www.hp.com/go/lookuptool

HP 3PAR StoreServ 10000 Base Configurations

Configurations supporting single phase power

HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache NEMA Rack Config Base	QR584C
HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache IEC Rack Config Base	QR632C
HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache Rackmount Config Base	QR633C
HP 3PAR StoreServ 10800 32GB Control/64GB Data Cache NEMA Rack Config Base	QR585C
HP 3PAR StoreServ 10800 32GB Control/64GB Data Cache IEC Rack Config Base	QR637C

- A minimum of one (1) configuration base must be ordered
- The base configuration for NEMA/IEC includes two Controller Nodes, one 2-meter Cabinet, service processor
- The Rackmount Configuration Base (QR633C) includes two Controller Nodes, rackmount kit (for backplane, controllers and service processor), service processor. A rackmount kit must be ordered separately for each drive chassis (see Drive section below). These rackmount kits are strictly for new installations into non-HP 3PAR racks.
- The 10400 base configuration includes total cache: 32GB control / 64GB data
- The 10800 base configuration includes total cache: 64GB control / 128GB data
- The base configuration and node configurations, shown in the section below, have built-in Gigabit Ethernet ports for management and Remote Copy over IP
- The base configurations do not include adapters (beyond embedded ports), drive chassis, drives, cables or expansion cabinets. These are to be ordered separately
- NEMA stands for the National Electrical Manufacturers Association. IEC stands for the International Electrotechnical Commission
  - With respect to HP 3PAR StoreServ 10000, NEMA (National Electrical Manufacturers Association) and IEC (International Electrotechnical Commission) refer to the plug types used. Generally, NEMA plugs are used in North America and IEC plugs are used everywhere else. There are exceptions, e.g., NEMA plugs are used in Japan.
  - The NEMA connector plug type used on the HP 3PAR StoreServ 10000 NEMA is the L6-30P with 1+1 redundant. The NEMA receptacles used on the 10000 NEMA are the L6-30R with 1+1 redundant
  - The IEC connector plug type used on the HP 3PAR StoreServ 10000 IEC is the IEC 60309, blue 30/32A, 2P+E with 1+1 redundant. The IEC receptacles used on the 10000 IEC are the IEC 60309, blue 30/32A, 2P+E with 1+1 redundant

Configurations supporting three phase power

HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache Rack Configuration Base	QW978A
HP 3PAR StoreServ 10400 16GB Control/32GB Data Cache Rackmount Config Base	QR633C
HP 3PAR StoreServ 10800 32GB Control/64GB Data Cache Rack Configuration Base	QW979A

- A minimum of one (1) configuration base must be ordered
- The base configuration includes two Controller Nodes, one 2-meter Cabinet, service processor
- The Rackmount Configuration Base (QR633C) includes two Controller Nodes, rackmount kit (for backplane, controllers and service processor), service processor. A rackmount kit must be ordered separately for each drive chassis (see Drive section below). These rackmount kits are strictly for new installations into non-HP 3PAR racks.
- The 10400 base configuration includes total cache: 32GB control / 64GB data

Configuration

- The 10800 base configuration includes total cache: 64GB control / 128GB data
- The base configuration and node configurations, shown in the section below, have built-in Gigabit Ethernet ports for management and Remote Copy over IP
- The base configurations do not include adapters (beyond embedded ports), drive chassis, drives, cables or expansion cabinets. These are to be ordered separately
- The base configuration and expansion rack PDUs are selected based on the Country and three phase selection option.
- PDUs can be NEMA which stands for the National Electrical Manufacturers Association or IEC which stands for the International Electrotechnical Commission
  - NEMA and IEC PDUs differ from each other based on Ampere ratings and the plug types used. Generally, NEMA based PDUs are used in North America and IEC based PDUs are used everywhere else. There are exceptions, e.g., NEMA based PDUs are used in Japan, Taiwan and Philippines.
  - The NEMA PDU SKUs used are 252663-D74 for single phase (not supported currently) and AF511A for three phase
  - The IEC PDU SKUs used are 252663-B33 for single phase (not supported currently) and AF518A for three phase
  - Refer to http://h18006.www1.hp.com/products/quickspecs/11041_div/11041_div.html for detailed specifications regarding these PDUs

HP 3PAR StoreServ 10000 Controller Node Configurations

HP 3PAR StoreServ 10400 2.8-GHz 16GB Control/32GB Data Cache Controller Node	QR586C
HP 3PAR StoreServ 10800 2.8-GHz 32GB Control/64GB Data Cache Controller Node	QR638C
HP 3PAR StoreServ 10400 2.8-GHz 16GB Control/32GB Data Cache Upg Controller Node	QR603C
HP 3PAR StoreServ 10800 3PAR 2.8-GHz 32GB Control/64GB Data Upg Controller Node	QR640C

- One (1) pair of Controller Nodes beyond the base configuration is supported on the 10400
- One (1), two (2) and three (3) pairs of Controller Nodes beyond the base configuration is supported on the 10800
- The 10400 Controller Nodes includes total cache: 32GB control / 64GB data
- The 10800 Controller Nodes includes total cache: 64GB control / 128GB data
- The node configurations and base configuration, shown in the section above, have built-in Gigabit Ethernet ports for management and Remote Copy over IP

HP 3PAR StoreServ 10000 Disk Adapters

HP 3PAR 10000 4-port 8Gb Fibre Channel Adapter	QR591A
HP 3PAR 10000 4-port 8Gb Fibre Channel Upgrade Adapter	QR608A

- Two (2) required per node or four (4) per node pair
- Disk Adapters must be ordered in addition to the base configurations and controller node configurations

HP 3PAR StoreServ 10000 Host Adapters

Configuration

HP 3PAR 10000 4-port 8Gb Fibre Channel Adapter	QR591A
HP 3PAR 10000 4-port 8Gb Fibre Channel Upgrade Adapter	QR608A
HP 3PAR 10000 2-port 10Gb Converged Network Adapter Card	QR630A
HP 3PAR 10000 Upgrade 2-port 10Gb Converged Network Adapter Card	QR610A

- QR630A and QR610A enable 10Gb/s iSCSI through a CNA

HP 3PAR StoreServ 10000 Drive Chassis

HP 3PAR StoreServ 10000 40-disk Drive Chassis	QR592C
HP 3PAR StoreServ 10000 40-disk Upgrade Drive Chassis	QR609C
HP 3PAR 10000 40-disk Drive Chassis Rack-mount Kit	QR598A

- When ordering QR633C, one QR598A must be ordered for each QR592C ordered
- When adding Drive Chassis to a system with QR633C, one QR598A must be ordered for each QR609C ordered

HP 3PAR StoreServ 10000 Drives

HP 3PAR SAS HDDs	HP 3PAR StoreServ 10000 4x300GB 6G 15K SFF SAS Drive Magazine	QW902A
	HP 3PAR StoreServ 10000 4x450GB 6G 10K SFF SAS Drive Magazine	QW903A
	HP 3PAR StoreServ 10000 4x900GB 6G 10K SFF SAS Drive Magazine	QW905A
	HP 3PAR StoreServ 10000 4x2TB 6G 7.2K SAS Drive Magazine	QW907A
	HP 3PAR StoreServ 10000 4x300GB 6G 15K SFF SAS Drive Upgrade Magazine	QW908A
	HP 3PAR StoreServ 10000 4x450GB 6G 10K SFF SAS Drive Upgrade Magazine	QW909A
	HP 3PAR StoreServ 10000 4x900GB 6G 10K SFF SAS Drive Upgrade Magazine	QW911A
	HP 3PAR StoreServ 10000 4x2TB 6G 7.2K LFF SAS Drive Upgrade Magazine	QW913A
HP 3PAR SSDs	HP 3PAR StoreServ 10000 4x100GB 4Gb Solid State Drive Magazine	QR619C
	HP 3PAR StoreServ 10000 4x200GB 4Gb Solid State Drive Magazine	QR620C
	HP 3PAR StoreServ 10000 4x400GB 6Gb SAS SFF(2.5-inch) Solid State Drive Magazine	C8R67A
	HP 3PAR StoreServ 10000 4x100GB 4Gb Solid State Drive Upgrade Magazine	QR624C
	HP 3PAR StoreServ 10000 4x200GB 4Gb Solid State Drive Upgrade Magazine	QR625C
	HP 3PAR StoreServ 10000 4x400GB 6Gb SAS SFF(2.5-inch) SSD Upgrade Magazine	C8R68A
HP 3PAR FC HDDs	HP 3PAR StoreServ 10000 4x300GB 4Gb FC 15K Drive Magazine	QR621C
	HP 3PAR StoreServ 10000 4x600GB 4Gb FC 15K Drive Magazine	QR622C
	HP 3PAR StoreServ 10000 4x300GB 4Gb FC 15K Drive Upgrade Magazine	QR626C
	HP 3PAR StoreServ 10000 4x600GB 4Gb FC 15K Drive Upgrade Magazine	QR627C
HP 3PAR NL HDDs	HP 3PAR StoreServ 10000 4x1TB 4Gb SATA 7.2K Drive Magazine	QR676C
	HP 3PAR StoreServ 10000 4x2TB 4Gb SATA 7.2K Drive Magazine	QR623C
	HP 3PAR StoreServ 10000 4x1TB 4Gb SATA 7.2K Drive Upgrade Magazine	QR677C
	HP 3PAR StoreServ 10000 4x2TB 4Gb SATA 7.2K Drive Upgrade Magazine	QR628C

Configuration

HP 3PAR Encryption HDDs	HP 3PAR StoreServ 10000 4x400GB 6Gb SAS SFF(2.5-inch) SSD Encryption Magazine	C8R61A
	HP 3PAR StoreServ 10000 4x450GB 6Gb SAS 10K SFF(2.5-inch) Encryption Magazine	C8R62A
	HP 3PAR StoreServ 10000 4x900GB 6Gb SAS 10K SFF(2.5-inch) Encryption Magazine	C8R63A
	HP 3PAR StoreServ 10000 4x400GB 6Gb SAS SFF(2.5-in) SSD Encryption Upg Magazine	C8R64A
	HP 3PAR StoreServ 10000 4x450GB 6Gb SAS 10K SFF(2.5-inch) Encrypt Upg Magazine	C8R65A
	HP 3PAR StoreServ 10000 4x900GB 6Gb SAS 10K SFF(2.5-inch) Encrypt Upg Magazine	C8R66A
HP 3PAR Encryption License	HP 3PAR StoreServ 10400 Data at Rest Encryption LTU	BC981A
	HP 3PAR StoreServ 10400 Data at Rest Encryption E-LTU	BC981AAE
	HP 3PAR StoreServ 10800 Data at Rest Encryption LTU	BC982A
	HP 3PAR StoreServ 10800 Data at Rest Encryption E-LTU	BC982AAE

Notes:

- All drives within a 3PAR StoreServ encrypted array must be self-encrypted devices. There cannot be a mixture of encrypted drives and non-encrypted drives within the same array.
- Self-encrypted drives are only supported on new 3PAR StoreServ 10000 Storage . Encryption is not supported on existing 3PAR systems that are already deployed in customer use.
- A data encryption license (LTU) is required to enable encryption on the array. One encryption license is required for each encrypted array.
- Once encryption is enabled on the 3PAR StoreServ Storage, it cannot be disabled.
- The local key manager is included in the 3PAR Inform OS. There is not a separately orderable partnumber for the local key manager.

HP 3PAR Cables

HP 3PAR 4m 50/125 (LC-LC) Fiber Cable	QL281B
HP P10000 V-Class 3PAR 6m 50/125 (LC-LC) Fiber Cable	QR631A
HP 3PAR 10m 50/125 (LC-LC) Fiber Cable	QL266B
HP P10000 V-Class 3PAR 25m 50/125 (LC-LC) Fiber Cable	QR593A
HP 3PAR 50m 50/125 (LC-LC) Fiber Cable	QL267B
HP 3PAR 100m 50/125 (LC-LC) Fiber Cable	QL268B

HP 3PAR StoreServ 10000 optional Cabinets

HP 3PAR StoreServ 10000 2-Meter Expansion Rack	QW982A
HP 3PAR 10000 2m Expansion NEMA Rack	QR596A
HP 3PAR 10000 2m Expansion IEC Rack	QR639A
HP 3PAR 10400 Standalone Rackmount kit	QR678A

* **NOTES:**

- QR678A can only be ordered as an upgrade part to a system containing QW978A only
- The strict use of QR678A is for relocating either QW978A to a non-HP 3PAR rack.
- When ordering QR678A, one QR598A must be ordered for each QR592C ordered
- When adding Drive Chassis to a system with QR678A, one QR598A must be ordered for

Configuration

each QR609C ordered

HP 3PAR StoreServ File Controller (For detailed specifications, please refer to File Controller section)

	HP 3PAR StoreServ File Controller	C8S69A
SPECIFICATIONS:		
Operating System	Microsoft Windows Storage Server 2012, Standard	
Processor	Intel® Xeon® E5-2609 (2.40GHz/4-core/10MB/80W) Processor	
Memory	16 GB (4 x 4GB)	
Storage Controller	Smart Array P420i with 1 GB FBWC Controller with internal SAS port for O/S drives)	
Internal Storage	2 x 450GB 6G SAS 10K 2.5" ENT hot-plug LFF HDDs (O/S mirror)	
Expansion Slots	3 x PCIe (6 with option PCIe Riser)	
Network Ports	4 x 1GbE	
Form Factor	2U Rack	

Additional Processor & Memory	HP DL380p Gen8 Intel® Xeon® E5-2609 (2.40GHz/4-core/10MB/80W) Processor Kit	662252-B21
	HP 4GB (1x4GB) Single Rank x4 PC3L-10600R (DDR3-1333) Registered CAS-9 Low Voltage Memory Kit	647893-B21
	NOTE: HP recommends that you add the same type memory to the product that is shipped standard with the product. **NOTE:** HP memory from previous generation servers are not fully compatible with Smart Memory features in Gen8 Servers. **NOTE:** All DDR3 memory option kits consist of one DIMM per kit. For detailed memory configuration rules and guidelines, please use the Online DDR3 Memory Configuration Tool: www.hp.com/go/ddr3memory-configurator. **NOTE:** PC3L is a low voltage memory. See the HP ProLiant Gen 8 QuickSpecs for information on memory configurations. http://h18004.www1.hp.com/products/quickspecs/14212_div/14212_div.html	
HP Networking	**Gigabit Ethernet adapters**	
	HP NC112T PCI Express Gigabit Server Adapter	503746-B21
	HP NC365T 4-port Ethernet Server Adapter	593722-B21
	HP Ethernet 1Gb 4-port 331T Adapter	647594-B21
	HP Ethernet 1Gb 2-port 361T Adapter	652497-B21
	HP Ethernet 1Gb 2-port 332T Adapter	615732-B21
	10 Gigabit Ethernet Adapters	
	HP NC523SFP 10Gb 2-port Server Adapter	593717-B21
	HP Ethernet 10Gb 2-port 530SFP Adapter	652503-B21
	HP Ethernet 10Gb 2-port 560SFP+ Adapter	665249-B21
	HP NC552SFP 10Gb 2-port Ethernet Server Adapter	614203-B21
	NOTE: A minimum of two Gigabytes (2 GB) of server memory is required per each adapter. **NOTE:** Direct Attach Cable (DAC) for copper environments or fiber transceivers and cables for fiber-optic environments must be purchased separately. **NOTE:** Multifunction Server Adapters support the installed Microsoft Windows Server	

Configuration

	Scalable Networking Pack, which enables TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.	
HP Optical Drives	HP 12.7mm Slim SATA DVD-ROM JackBlack Optical Drive	652232-B21
	HP 12.7mm Slim SATA DVD-RW JackBlack Optical Drive	652235-B21
HP I/O Expansion Options	HP DL380p/560 Gen8 3 Slot PCI-E Riser Kit **NOTE:** When populating the second optional riser slot, the second processor must be installed.	653206-B21
HP Security	HP Trusted Platform Module Option **NOTE:** The TPM (Trusted Platform Module) is a microcontroller chip that can securely store artifacts used to authenticate the server platform. These artifacts can include passwords, certificates and encryption keys. Windows® BitLocker™ Drive Encryption (BitLocker) is a data protection feature available in Windows Server® 2008. BitLocker leverages the enhanced security capabilities of a Trusted Platform Module (TPM) version 1.2. The TPM works with BitLocker to help protect user data and to ensure that a server running Windows Server 2008 has not been tampered with while the system was offline. For more information about TPM, including a white paper, go to: www.hp.com/go/TPM. **NOTE:** The TPM key is unique to every TPM deployed server and must be retained. Misplacing or losing the key could result in data loss.	488069-B21
Storage Fibre Channel HBA	**Brocade Fibre Channel HBAs**	
	HP 82B 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AP770B
	Emulex Fibre Channel HBAs	
	HP 82E 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AJ763B
	HP SN1000E 16Gb 2-port PCIe Fibre Channel Host Bus Adapter	QR559A
	HP StoreFabric SN1000Q 16GB 2-port PCIe Fibre Channel Host Bus Adapter	QW972A
	QLogic Fibre Channel HBAs	
	HP 82Q 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AJ764A
	Converged Network Adapter	
	HP CN1100E Dual Port Converged Network Adapter	BK835A
	HP CN1000Q Dual Port Converged Network Adapter	BS668A
	NOTE: HBAs are not included standard. HBA selection is left as your choice based on existing SAN infrastructure. **NOTE:** For the complete listing of Fibre Channel Host Bus Adapters for Windows 2000, Windows Server 2003 and Linux, please see: http://h18006.www1.hp.com/storage/saninfrastructure/hba.html	
Power Cord	HP C13 - Nema 5-15P US/CA 110V 10Amp 1.83m Power Cord	AF556A
	HP C13 - GB-1002 CN 250V 10Amp 1.83m Power Cord	AF557A
	HP C13 - IRAM -2073 AR 250V 10A 2.5m Power Cord	AF558A
	HP C13 - Nema 5-15P TH/PH 250V 10Amp 1.83m Power Cord	AF559A
	HP C13 - KSC- 8305 KR 250V 10Amp 1.83m Power Cord	AF560A

HP C13 - CNS-690 TW 110V 13Amp 1.83m Power Cord	AF561A
HP C13 - IS-1293 IN 240V 6Amp LV 2.0m Power Cord	AF562A
HP C13 - AS3112-3 AU 250V 10Amp 2.5m Power Cord	AF569A
HP C13 - SEV 1011 CH 250V 10Amp 1.83m Power Cord	AF565A
HP C13 - DK-2.5A DK 250V 10Amp 1.83m Power Cord	AF566A
HP C13 - CEE-VII EU 250V 10Amp 1.83m Power Cord	AF568A
HP C13 - SI-32 IL 250V 10Amp 1.83m Power Cord	AF564A
HP C13 - CEI-23-50 IT/CL 250V 10Amp 1.83m Power Cord	AF571A
HP C13 - JIS C8303 JP 100V 12Amp 2.0m Power Cord	AF572A
HP C13 - BS-1363A UK/HK/SG 250V 10Amp 1.83m Power Cord	AF570A
HP C13 - SABS-164 ZA 250V 10Amp 2.5m Power Cord	AF567A
HP C13 - NBR-14136 BR 250V 10Amp 1.83m Power Cord	AF591A

Storage Networking Options

Fibre Channel Host Bus Adapters	**Brocade Fibre Channel HBAs**	
	HP 81B 8Gb 1-port PCIe Fibre Channel Host Bus Adapter	AP769B
	HP 82B 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AP770B
	HP 41B 4Gb 1-port PCIe Fibre Channel Host Bus Adapter	AP767B
	HP 42B 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	AP768B
	Emulex Fibre Channel HBAs	
	HP 81E 8Gb 1-port PCIe Fibre Channel Host Bus Adapter	AJ762B
	HP 82E 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AJ763B
	HP FC2142SR 4Gb 1-port PCIe Fibre Channel Host Bus Adapter	A8002B
	HP FC2242SR 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	A8003B
	QLogic Fibre Channel HBAs	
	HP 81Q 8Gb 1-port PCIe Fibre Channel Host Bus Adapter	AK344A
	HP 82Q 8Gb 2-port PCIe Fibre Channel Host Bus Adapter	AJ764A
	HP FC1142SR 4Gb 1-port PCIe Fibre Channel Host Bus Adapter	AE311A
	HP FC1242SR 4Gb 2-port PCIe Fibre Channel Host Bus Adapter	AE312A
Fibre Channel Switches	**HP B-series**	
	8 Gb Fibre Channel Switches	
	HP 8/8 Base (0) e-port SAN Switch	AM866B
	HP 8/8 (8) Full Fabric Ports Enabled SAN Switch	AM867B
	HP 8/24 Base (16) Full Fabric Ports Enabled SAN Switch	AM868B
	HP 8/40 Base (24) Full Fabric Ports Enabled SAN Switch	AM869B
	HP 8/40 Power Pack+ (24) Full Fabric Ports Enabled SAN Switch	AM870B
	HP 8/80 Base (48) Full Fabric Ports Enabled SAN Switch	AM871B
	HP 8/80 Power Pack+ (48) Full Fabric Ports Enabled SAN Switch	AM872B
	16 Gb Fibre Channel Switches	

Configuration

HP SN3000B 16Gb 24-port/12-port Active Fibre Channel Switch	QW937A
HP SN3000B 16Gb 24-port/24-port Active Fibre Channel Switch	QW938A
HP SN6000B 16Gb 48-port/24-port Active Fibre Channel Switch	QK753B
HP SN6000B 16Gb 48-port/48-port Active Fibre Channel Switch	QR480B
HP SN6000B 16Gb 48-port/24-port Active Power Pack+ Fibre Channel Switch	QK754B
HP SN6000B 16Gb 48-port/48-port Active Power Pack+ Fibre Channel Switch	QR481B
8 Gb and 16 Gb Director Switches	
HP SN8000B 8-Slot Power Pack+ SAN Backbone Director Switch	QK710B
HP SN8000B 4-Slot Power Pack+ SAN Director Switch	QK711B
HP SN8000B 4-Slot SAN Director Switch	QK712B
HP DC SAN Backbone Director Switch Power Pack	AK857C
HP DC04 SAN Director Switch	AR478B
HP DC04 Power Pack+ SAN Director Switch	AR479B
Extension and Embedded Switches	
HP 1606 FCIP 4-pt Enabled 8Gb FC 2-pt Enabled 1GbE Base Switch	AP862B
HP 1606 FCIP 16-pt Enabled 8Gb FC 6-pt Enabled 1GbE Full Switch	AP863B
HP 1606 FCIP 16-pt Enabled 8Gb FC 6-pt Enabled 1GbE Power Pack+ Switch	AP864B
HP B-series 8/12c SAN Switch for BladeSystem c-Class	AJ820B
HP B-series 8/24c SAN Switch for BladeSystem c-Class	AJ821B
HP B-series 8/24c Power Pack+ SAN Switch for BladeSystem c-Class	AJ822B
HP H-series	
HP 8/20q Fibre Channel 8-ports Active Switch **NOTE:** 8 device ports active, upgradeable to 20 device ports active	AQ233B
HP 8Gb Simple SAN Connection Kit **NOTE:** 8 device ports active, upgradeable to 20 device ports active	AK241B
HP 8/20q Fibre Channel Switch **NOTE:** 16 switch ports active, upgradeable to 20 device ports active	AK242B
HP SN6000 Stackable 8Gb 24-port Single Power Fibre Channel Switch **NOTE:** 20 device ports active/4 stacking (ISL) ports active	AW575B
HP SN6000 Stackable 8Gb 24-port Dual Power Fibre Channel Switch **NOTE:** 20 device ports active/4 stacking (ISL) ports active	AW576B
HP SN6000 Stackable 12-port Single Power FC Switch **NOTE:** 8 device ports/4 stacking (ISL) ports active, upgradeable to 20 device ports active	BK780B
HP C-series	
HP SN8000C 13-Slot Supervisor 2A Fabric 3 Director Switch	QW927A
HP SN8000C 6-Slot Supervisor 2A Director Switch	AE388C
HP SN8000C 9-Slot Supervisor 2A Director Switch	AE389C
HP SN6000C 8Gb 16-port Fibre Channel Switch	AW585A
HP SN6000C 8Gb 32-port Fibre Channel Switch	AW586A
HP MDS 8/12c BladeSystem Fabric Switch	AW563A
HP MDS 8/24c BladeSystem Fabric Switch	AW564A

Configuration

HP MDS 9124 8-ports Active Fabric Switch	AG646A
HP MDS 9124 16-ports Active Fabric Switch	AG647A
Cisco MDS 9222i Multiservice with 0 SFP Transceiver Modular Fabric Switch	AG851B

For additional details on SAN infrastructure components and options and storage compatibility information, please visit: http://hp.com/go/san or select from the part numbers below.

Technical Specifications

Physical Specifications

2-Meter Cabinet supporting single phase power

Dimensions (width x height x depth)	23.6 x 76.5 x 36 in	60 x 194.3 x 91.3 cm
Service Clearance (front and back)	Front/Rear: 36 in / 30 in	Front/Rear: 91.4 cm / 76.2 cm
Weight (not populated)	439.8 lb	195.5 kg
Maximum Weight (fully populated)	1,880 lb	852.8 kg
Maximum Weight per Leveling Foot	470 lb	213.2 kg
Maximum Load per Leveling Foot	149.6 lb/sq in	10.5 kg/sq cm

2-Meter Cabinet supporting three phase power

Dimensions (width x height x depth)	23.6 x 76.5 x 36 in	60 x 194.3 x 91.3 cm
Service Clearance (front and back)	Front/Rear: 36 in / 30 in	Front/Rear: 91.4 cm / 76.2 cm
Weight (not populated)	472.1 lb	214.1 kg
Maximum Weight (fully populated)	1,912.3 lb	867.4 kg
Maximum Weight per Leveling Foot	478.1 lb	216.8 kg
Maximum Load per Leveling Foot	199.2 lb/sq in	14 kg/sq cm

Component Weights

V400 Base Configuration[1]	654.1 lb	296.7 kg
V800 Base Configuration[1]	747.1 lb	338.9 kg
10400 Base Configuration[7]	686.4 lb	311.3 kg
10800 Base Configuration[7]	779.4 lb	353.5 kg
2 Controller Nodes (fully populated)	133 lb	60.4 kg
Drive Chassis (fully populated)	180 lb	81.6 kg
Service Processor	13.3 lb	6.0 kg

Supported Host FC Connections

FC Connector Type from Storage System to Host Port	LC to LC
FC Cable Core Diameter	OM3
Connector Boot Length	standard

Power and Heat

Single Phase Power Supply Requirements

Input Voltage (VAC)	220 (200 - 240)
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	30 A per PDU[6] (de-rated to 24 A)
Power Connectors for 2-Meter Cabinet	(4) L6-30P with 1+1 redundant or (4) IEC 60309-32A (332P6S) with 1+1 redundant
Power Receptacles	(4) L6-30R with 1+1 redundant or (4) IEC 60309 with 1+1 redundant

Technical Specifications

Three Phase Power Supply Requirements

NEMA (North America, Taiwan, Philippines & Japan)

Input Voltage (VAC)	200 - 240 p-p
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	48 A per PDU (de-rated to 27.71 A per phase)
Power Connectors for 2-Meter Cabinet	(2) IEC 309, 3-pole, 4-wire, BLUE, gnd clocked to 3:00 with 1+1 redundant
Power Receptacles	(2) Hubbell HBL460C9W or equivalent

IEC (International)

Input Voltage (VAC)	200 - 240 p-n; 380 - 415p-p
Frequency (Hz)	50 - 60
Circuit Breaker Maximum	32 A per phase per PDU
Power Connectors for 2-Meter Cabinet	(2) IEC 309, 4-pole, 5-wire, RED, gnd clocked to 6:00 with 1+1 redundant
Power Receptacles	(2) Hubbell C532C6S or equivalent

Maximum Potential Power Draw per 2-Meter Cabinet

Watts per Cabinet	9,984 watts / 34,075 BTU/h

Actual Power Draw / Heat Dissipation

Service Processor	317 watts / 1,082 BTU/h
Drive Chassis (without Drive Magazines)	200 watts / 683 BTU/h

	Transactional[3] (watts / BTU/h)	**Idle (watts / BTU/h)**
4 x 100-GB SSD	89.8 / 303	5.5 / 19
4 x 200-GB SSD	10.38.4 / 3528.7	75.5 / 1924
4 x 400-GB SSD / 4 x 400-GB Encryption SSD	14.8 / 50.5	8.8 / 30
4 x 300-GB SFF SAS Drive Magazine	39 / 132	34 / 117
4 x 450-GB SFF SAS/ Encryption Drive Magazine	29 27.2 / 9992.8	24 22 / 8175.1
4 x 900-GB SFF SAS/ Encryption Drive Magazine	31.529.2 / 107.599.6	23 22.4 / 8076.4
4 x 2-TB LFF SAS Drive Magazine	47 / 160	35 / 119
4 x 300-GB FC Drive Magazine	75 / 256	57 / 195
4 x 600-GB FC Drive Magazine	76 / 258	65 / 222
4 x 2-TB NL Drive Magazine	62 / 211	38 / 131
Controller Node Pair	1,315 / 4,487	990 / 3,378
Example Full Cabinet Configuration (4-Node 10400; 4 Drive Chassis, 160 600-GB drives,1 service processor)	6,787 / 23,184	5,697 / 20,400

Technical Specifications

Environmental Specifications

Temperature (°F/°C), 0 - 3,000 ft / 0 - 914.4 m	50 - 104°F / 10 - 40°C
Temperature (°F/°C), 3,000 - 10,000 ft / 914.4 m - 3,048 m	50 - 95°F / 10 - 35°C
Altitude (ft/m) max.	10,000 ft / 3,048 m
Humidity (%), Non-condensing	20 - 80%
Raised Floor	Recommended
Emissions / RFI / EMI	FCC Class A, EN55022 Class A,EN55024: 1998, VCCI Class A
Safety	CE Mark, C-TUVus Mark, TUV GS Mark, CB Scheme with all country deviations
Energy Consumption Efficiency[5] (Japan Green Law)	0.011

[1] Includes 2-meter rack that supports single phase power and two controller nodes (fully populated)
[2] Maximum, Up to 10 drive magazines (40 drives) of any combination of SAS, FC, NL or SSD and up to 8 SSD magazines (32 SSD drives) per Drive Chassis
[3] Under maximum load
[4] Includes power and heat dissipation specifications for the Service Processor as follows: 317 Watts, 1082 BTU/hr, 100 - 240 VAC Input Voltage, 50 - 60 Hz Frequency, and (1) IEC-320 Power Receptacle
[5] Japan Green Law statement of compliance: The energy consumption efficiency value has been calculated per requirements for Category-N Magnetic Disk Drive Units by dividing the power consumption, measured according to the definition in the Law Concerning the Rational Use of Energy, by the storage capacity defined in the Energy Conservation Law. The efficiency value is based on a host-maximized 10800 configuration using 600GB drives.
[6] Power Distribution Unit
[7] Includes 2-meter rack that supports three phase power and two controller nodes (fully populated)
NOTE: Specifications are subject to change without notice.

Overview - HP 3PAR StoreServ File Controller

HP 3PAR StoreServ File Controller is a new converged storage capability on the HP 3PAR StoreServ Storage platform. It adds support for file services to the 3PAR StoreServ. The HP 3PAR StoreServ File Controller is designed to deliver efficient, secure, and highly available file capaility that supports hundreds to thousands of concurrent users.

What's New

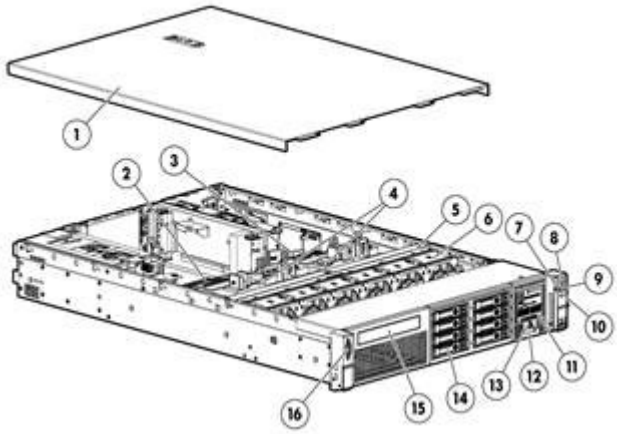
- 3PAR File Services capability for HP 3PAR StoreServ Storage.
- Wizard-based easy clustering for ease of deployment.

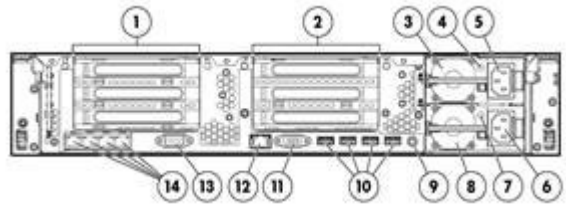
HP 3Par StoreServ File Controller

The HP 3PAR StoreServ File Controller sets the standard for performance and expandability for file services for the 3PAR StoreServ platform. It leverages the 3PAR StoreServ Storage data services and extends the benefits to file workloads. Please refer to the respective sections for details on the data services.

Models

HP 3PAR StoreServ File Controller C8S69A





Front View:

1. Quick removal access panel
2. Second Intel Processor
3. First Intel Processor
4. 24 DIMM slots: DDR3 Registered (RDIMM), Load Reduced (LRDIMM), or Unbuffered (UDIMM) memory
5. Air Baffle
6. Hot-plug fans, full N+1 redundancy
7. Health LED
8. Power On /Standby button and system power LED button
9. USB connector
10. Unit ID LED

Rear View:

1. PCIe 3.0 Slots 1, 2, 3-PCIe 2.0 top to bottom
2. N/A
3. Power supply 1
4. Power supply 1 Power LED
5. Power supply 1 Power connection (with Intelligent PDU communication)
6. Power supply 2 Power connection (with Intelligent PDU communication)
7. Power supply 2 Power LED
8. Power supply 2
9. Unit ID LED/Button
10. USB connectors (4)

Overview - HP 3PAR StoreServ File Controller

11. Systems Insight Display
12. Asset Tag
13. USB connector
14. Drive Bays
15. Optional Slim Optical Bay (SATA DVD-RW /ROM Optical Drive)
16. Video connector

11. Video connector
12. iLO connector
13. Serial connector
14. FlexibleLOM ports (Shown: 4 ports 1Gb each /Optional: 2 ports 10Gb each)

Features and Benefits - HP 3PAR StoreServ File Controller

Efficient: Save money and time	The HP 3PAR StoreServ File Controller supports thousands users concurrently accessing their files. Non intrusive variable chunk de-duplication delivers an average 50-60% space savings, and included evaluation tool facilitates capacity planning. Consolidate multiple diverse file protocols (NFS: v2, v3, v4.1 | SMB: 2.0, 2.1, 3.0 | WebDAV | FTP/FTPS | HTTP/HTTPS) as well as IT services (e.g. print, DNS, DHCP) in a single platform. Hosted BranchCache reduces your branch office WAN usage by automatically caching frequently accessed headquarter datacenter files. Straightforward and consistent management experience that provides storage management for both file and block based workloads.
Secure: Protect your data and organization always	Built in file system encryption and optional BitLocker Drive Encryption secures data at rest while SMB Encryption protects data in flight. File Classification Infrastructure facilitates sophisticated access controls and support for Active Directory Rights Management Services protects files no matter where they go. Online snapshots enable users to directly recover files and prior file versions. Broad support for onboard endpoint protection (antivirus) software eliminates the need to purchase additional external infrastructure. Broad support for agent-based data protection enhances the ability to meet backup and recovery SLAs.
Highly Available: Prevent User and Organization disruption	Turnkey clustered controller configurations with transparent failover for SMB and NFS provide continuous availability. Cluster aware updates enable online maintenance. File system online self healing, online verification, and precise and rapid repair massively reduce downtime from file corruption. HP Active Health System, mirrored OS disks, RAID for data disks, redundant fans and power, and advanced memory protection maximize uptime. Three year onsite parts and labor warranty for the system, and one year of software telephone support.

Operating System Microsoft Windows Storage Server 2012, Standard Edition

- Windows Storage Server 2012 (WSS2012) includes a robust range of file serving and storage capabilities. It addresses heterogeneous file workload environments and enables more efficient storage utilization. It allows for a flexible mix of configurations and includes advanced data management tools. WSS2012 leverages your Windows Server management skill sets and tools including Active Directory, PowerShell and System Center.
- Extensive protocol support: SMB (2.0, 2.1, 3.0), NFS (v2, v3, v4.1), WebDAV, HTTP/HTTPS, FTP/FTPS, ISCSI
- SMB 3.0: Leverage high performance continually available file shares to deliver feature-rich storage for continuously available file services, business-critical applications and virtual servers using advanced new functionality.
- New VHDX Standard: Deploy larger capacity virtual storage that can grow to 16 terabytes, is more resilient against corruption, and provides more efficient usage of new 4 KB sector hard disks with the new VHDX virtual storage standard.
- Live Storage Migration: Maintain maximized service-level availability even while moving virtual machine storage between host servers independent of the actual virtual machine.
- SMB Multi-channel: Enable aggregation of network bandwidth and network fault tolerance when multiple paths are available between SMB clients and file servers.
- NFS v4.1: For Windows Storage Server 2012, Server for NFS has been updated to support continuous availability. These improvements make it possible to reliably store and run VMware ESX on a virtual machine that is running Windows Server 2012 by using the NFS protocol to share files. Additional improvements in failover clustering take advantage of better resilience to hardware and software outages that may afflict individual cluster nodes. At the same time, failover clustering isolates VMware ESX hypervisor hosts from intermittent glitches during failovers.
- Data Deduplication: Data deduplication enables Windows Storage Server 2012 to store more data in less physical space and achieve storage efficiency that is significantly higher than was possible in previous releases of Windows Storage Server that used Single Instance Storage (SIS) or NTFS file system compression. Data deduplication uses variable size chunking and compression, which deliver optimization ratios of 2:1 for general file servers and up to 20:1 for virtualization data. Evaluate your savings with the Deduplication Evaluation Tool.
  Volume Shadow Copy Service: Creates point-in-time copies (snapshots) of files and folders at predetermined time intervals that can then be accessed from client computers.
- VSS for Remote SMB File Shares: Leverage proven Volume Shadow Copy Service (VSS) to offload snapshot and backup operations to remote storage from VSS hardware providers within Hyper-V virtual machines.
- Hosted Branch Cache: Using client/server architecture, Windows 7 and above client computers can cache content on the local network via the Hosted Cache running on the 3PAR StoreServ File Controller. Other clients who need the same content retrieve it directly from the Hosted Cache.
- DFS Namespaces: Enables you to group shared folders that are located on different servers into one or more logically structured namespaces. Each namespace appears to users as a single shared folder with a series of subfolders. However, the underlying structure of the namespace can consist of numerous file shares that are located on different servers and in multiple sites.
- Distributed File System Replication (DFS-R): Enables you to efficiently replicate folders (including those referred to by a DFS namespace path) across multiple servers and sites. DFS Replication uses a compression algorithm known as remote differential compression (RDC). RDC detects changes to the data in a file, and it enables DFS Replication to replicate only the changed file blocks instead of the entire file.
- File Server Resource Manager (FSRM): File Server Resource Manager is a set of features that allow you to manage and classify data that is stored on file servers. File Server Resource Manager includes the following features:

- Storage reports: Storage reports are used to help you identify trends in disk usage and how your data is classified. You can also monitor a selected group of users for attempts to save unauthorized files.
- File Classification Infrastructure: File Classification Infrastructure provides insight into your data by automating classification processes so that you can manage your data more effectively. You can classify files and apply policies based on this classification. Example policies include dynamic access control for restricting access to files, file encryption, and file expiration. Files can be classified automatically by using file classification rules or manually by modifying the properties of a selected file or folder.
- File Management Tasks: File Management Tasks enables you to apply a conditional policy or action to files based on their classification. The conditions of a file management task include the file location, the classification properties, the date the file was created, the last modified date of the file, or the last time the file was accessed. The actions that a file management task can take include the ability to expire files, encrypt files, or run a custom command.
- Quota management: Quotas allow you to limit the space that is allowed for a volume or folder, and they can be automatically applied to new folders that are created on a volume. You can also define quota templates that can be applied to new volumes or folders.
- File screening management: File screens help you control the types of files that user can store on a file server. You can limit the extension that can be stored on your shared files. For example, you can create a file screen that does not allow files with an MP3 extension to be stored in personal shared folders on a file server.

- Initial Configuration Tasks Wizard: Simplifies and accelerates new device deployment by presenting basic system settings on your first boot.
- Server Manager
- Print Management Console: Manage multiple printers (license for unlimited printer support) from a single console, whether locally or over the WAN
- Unlimited Client Access Licenses (CALs) included

Processor / Cache Memory	Intel® Xeon® E5-2609 (2.40GHz/4-core/10MB/80W) Processor	
Memory	Type	DDR3 Registered (RDIMM) standard
	Standard	16GB (4 x 4GB)
	DIMM Sockets	24
Network Controller	NIC Ports	4
	Controller	HP Ethernet 1Gb 4-port 331FLR Adapter

SAN / Array Compatibility - HP 3PAR StoreServ File Controller

HP 3PAR StoreServ File Controller

Expansion Slots

Primary Riser (Standard)	Expansion Slots #	Technology	Bus Width**	Connector Width	Bus Number*	Form Factor	Notes
	1	PCIe 3.0	X16	X16	7	Full Length, Full Height Slot	Proc 1
	2	PCIe 3.0	X8	X8	10	Half Length, Full Height Slot	Proc 1
	3	PCIe 2.0	X4	X8	13	Half Length, Full Height Slot	Chipset

* Default bus assignment (in decimal). Inserting cards with PCI bridges may alter the actual bus assignment number

** Indicates the number of physical electrical lanes running to the connector.

NOTE: When populating the second optional riser slot, the second processor must be installed.

NOTE: All slots support up to 150w PCIe cards, but an additional Power Cord Option is required (PN 669777-B21). See Option Section below for offering.

PCIe Riser (Optional 3-slot)	Expansion Slots #	Technology	Bus Width**	Connector Width	Bus Number*	Form Factor	Notes
	4	PCIe 3.0	X16	X16	16	Full Length, Full Height Slot	Proc 2
	5	PCIe 3.0	X8	X8	20	Half Length, Full Height Slot	Proc 2
	6	PCIe 3.0	X4	X8	23	Half Length, Full Height Slot	Proc 2

* Default bus assignment (in decimal). Inserting cards with PCI bridges may alter the actual bus assignment number

** Indicates the number of physical electrical lanes running to the connector.

NOTE: When populating the second optional riser slot, the second processor must be installed.

NOTE: All slots support up to 150w PCIe cards, but an additional Power Cord Option is required (669777-B21). See Option Section below for offering

Storage Controller

NOTE: HP 3PAR StoreServ File Controller includes a storage controller designed for internal drives housing the O/S mirror only; an HBA is required to address connectivity to the 3PAR StoreServ Storage array.

Controller(s)	HP Smart Array P420i/1GB with FBWC
RAID	Needed for internal drive mirror only

SAN / Array Compatibility - HP 3PAR StoreServ File Controller

Storage	Hard Drives	
	Internal	Eight 2.5" (Small Form Factor) hot-plug bays • 2 x 450GB 6G SAS 15K SFF HDDs for O/S mirror
	External	3PAR StoreServ Storage using Fibre Channel
Power Supply	2 x 460 Watts Platinum	
Power Cords	**NOTE:** The HP 3PAR StoreServ File Controller is primarily connected to PDU's in data center racks so they now ship standard with only a PDU 6-foot C-14 to C13 power cord (142258-001). If a user wishes to power a system using a110V receptacle see Power Cord option section for more options.	
System Fans	(4) (N+1 redundancy standard)	
Form Factor	2U Rack form factor	
Host Bus Adapter (HBA) Support	HP 3PAR StoreServ File Controller is designed to be connected to a HP 3PAR SToreServ Storage array by adding a recommended Fibre Channel HBA.	

Warranty

3 Year, On-site Warranty Service. 7x24 4-hour remote response with next business day on-site response

HP warrants only that the Software media will be free of physical defects for a period of ninety (90) days from delivery.

For more information about HP's Global Limited Warranty and Technical Support, visit:
http://www.hp.com/products/storageworks/warranty

Services Included with the Product	**One year of HP Software Support, standard 9x5 business hours (software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service).**

For increased uptime, productivity and ROI-HP Care Pack packaged services for Storage
These days, you need to get the most out of your storage investment-you can't afford not to. When you buy HP storage products and solutions, it's also a good time to think about what levels of service and support you may need. To help take the worry out of deploying, designing, maintaining, and managing your environment, we've designed a portfolio of service options that are as: flexible, reliable and scalable as your storage. Unlike storage-only vendors, we take a holistic approach to your entire environment, bridging storage, servers, blades, software and network infrastructures with our HP Care Pack packaged services for Storage.

Protect your business beyond the warranty
When it comes to robustness and reliability, standard warranties on today's computing equipment have matured just as the technologies have matured. Good news on some fronts-but also a source of potential problems and subsequent consequences that come from depending on standard warranties alone. Standard warranty protects against product defects and some causes of downtime- but not the business. By using a standard approach to warranty uplifts, such as HP Care Pack Services, you can reduce downtime risks and be more certain of operational consistency for both mission-critical and standard business computing. Simply put, HP Care Pack Services normalize the warranty of combined products - helping you proactively guard against unplanned downtime.

Extending warranties with HP Care Pack Services
For cost-effective upgrading or extending your standard warranty, HP Care Pack Services offer a suite of standard reactive hardware and software support services that are sold separately, or combined as with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition, with HP Proactive Select we offer an innovative approach to service delivery that gives you the flexibility to acquire the specific proactive services you need today, then add services as your needs evolve. HP Proactive Select offers a broad set of technical or per-event type service options - including server, storage, and network, SAN device, and software, environment, installation and education services. Services that you can mix and match depending on your specific requirements, from preliminary planning and equipment delivery to installation, configuration, integration, and testing, through every level of ongoing support. Our HP Care Pack packaged services for Storage assures help when you need it most. And for many products, post-warranty HP Care Pack Services are available when your original warranty has expired.

HP Storage Services: Offering reliability, flexibility and value-just like your storage
HP Storage Services offers a full spectrum of customer care, from technology support to complex migrations to complete completely managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education offers flexible, comprehensive training on storage networking, disk storage systems, and storage software to help your IT staff get the most out of your investments. And HP Financial solutions extend innovative financing and asset management programs to cost-effective buy, manage and eventually retire your older equipment.

HP Storage Services, the trusted business technology experts who manage your technology in action, because when technology works, business works. http://www.hp.com/hps/storage

NOTE: Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners

- **Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.**
- **Customers purchasing from a commercial reseller can find HP Care Pack Services at: http://www.hp.com/go/lookuptool**

Recommended HP Care Pack Services for optimal satisfaction with your HP product.

Recommended Services

3-Year HP Support Plus 24
For a higher return on your storage investment, HP Support Plus 24 provides integrated hardware and software support services designed specifically for your technology. Available 24x7, this 3-year combined reactive support option delivers onsite hardware support and over-the-phone software support around-the-clock. Leverage the full strength of HP Technology Services - customers can trust the services professionals at HP to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure.

- **Improve uptime with responsive hardware and software services**
- **Enjoy consistent service coverage across geographically dispersed sites**
- **Update HP software at a predictable cost**
- **Increase customer satisfaction-with no interoperability gaps**

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EN.pdf

HP Installation and Startup Service for 3PAR StoreServ File Controller
For smooth startup, HP Installation and Startup Service provides for deployment of your HP 3PAR StoreServ File Controller while helping you establish readily available access to and management of your critical data and applications. Leverage the full strength of HP Technology Services - customers can trust the services professionals at HP to work collaboratively with them, putting our strategic and technical know-how to work across their entire infrastructure.

- **System installation and setup by a HP technical specialist**
- **Reduced implementation time and cost**
- **Verification prior to installation that all service prerequisites are met**
- **Availability of an HP service specialist to answer basic questions related to this service during the orientation session**
- **Potential expansion of the number of shares and hosts**

http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-6112ENL.pdf

HP Proactive Select Service
HP Proactive Select Service improves your IT performance and manageability through the use of cost effective flexible services. HP provides technical expertise and best practices to accelerate ROI of your technology investment. Selectable proactive services span a wide range of technology and

process services - a flexible way to purchase proactive services that fit your particular environment and situation.
HP Proactive Select Service is technology agnostic and purchased in addition to your choice of underlying reactive support.

- Access to a list of flexible and customizable proactive service activities
- Enhance customers' in-house IT team with complementary assistance from HP
- Improved time to solution
- Reduce business risk and project costs by accessing HP specialists
- Simplify IT operational procedures by leveraging HP best practices

http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-3842ENN.pdf

Optional HP Care Pack Services that will enhance your HP product experience.

Optional Services

HP Data Migration Service for Windows
For customers who need to safely migrate Windows data within their TCP/IP networks with minimal impact to their operations:

You have a need to migrate data between Windows servers within your TCP/IP network. Or you have a need to migrate storage for your Windows servers. Or both. And you need to accomplish these migrations efficiently while minimizing risk at the same time.

HP Data Migration Service for Windows offers you a cost competitive and convenient way to accommodate data migration triggered by a need to refresh or consolidate storage, or to create different storage tiers. This service offers a migration cost in line with the costs of storage products in small and medium-sized storage environments. The service is delivered via a skilled HP service specialist with special consideration for data availability, integrity, and ongoing operational performance during the transfer process.

http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA2-4734ENW.pdf

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eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

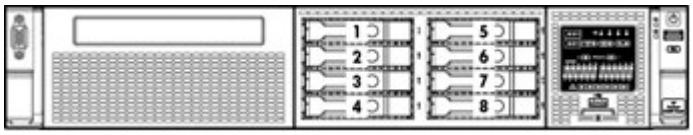
Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

	Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support
Customer Technical Training	**Consider education as an integral part of your strategy to get the best return on investment for your HP storage solution. HP offers a variety of training courses on storage software, networking, archiving and disk storage systems. Our classes are available in many delivery modalities from traditional instructor-led courses at one of our 80 training centers worldwide to on-site training customized to your needs or online. www.hp.com/learn/storage**
HP Services Awards	**HP Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction. For a list of all our awards, please visit: http://h20219.www2.hp.com/services/cache/433028-0-0-225-121.html**
Additional Services Information	**For more information about HP Care Pack Services for Storage, please visit: http://www.hp.com/hps/storageIf you have specific questions, contact your local HP representative. Contact information for a representative in your area can be found at "Contact HP" http://www.hp.com**

Storage - HP 3PAR StoreServ File Controller



1-8	Eight 3.5" (LFF) hot plug hard drive bays (File Controller ships with only two SAS drives for OS)

Technical Specifications - HP 3PAR StoreServ File Controller

3PAR StoreServ File Controller			
Dimensions (H x W x D) (with bezel)	SFF Drives: 3.44 x 17.54 x 27.50 in (8.73 x 44.55 x 69.85 cm)		
Weight (approximate)	Maximum (all hard drives, power supply, and processor installed)	61.00 lb (27.66 kg)	
	Minimum (one SFF hard drive, power supply, and processor installed, ODD not installed)	41.0 lb (18.59 kg)	
Input Requirements (per power supply)	Rated Line Voltage	100 to 120 VAC 200 to 240 VAC	
	Rated Input Current	For 1200 W Power Supply:	10 A (at 100 VAC), 4.9 A (at 200 VAC)
		For 750 W Power Supply:	8.9 A (at 100 VAC), 4.3 A (at 200 VAC)
		For 460 W Power Supply:	5.5 A (at 100 VAC), 2.6 A (at 200 VAC)
	Rated Input Frequency	50 to 60 Hz	
	Rated Input Power	For 1200 W Power Supply:	930 W (at 100 VAC), 1348 W (at 200 VAC)
		For 750 W Power Supply:	857 W (at 100 VAC), 824 W (at 200 VAC)
		For 460 W Power Supply:	526 W (at 100 VAC), 505 W (at 200 VAC)
BTU Rating	Maximum	For 1200 W Power Supply:	3530 BTU/hr (at 100 VAC), 4600 BTU/hr (at 200 VAC)
		For 750 W Power Supply:	2925 BTU/hr (at 100 VAC), 2812 BTU/hr (at 200 VAC)
		For 460 W Power Supply:	1794 BTU/hr (at 100 VAC), 1725 BTU/hr (at 200 VAC)
Power Supply Output (per power supply)	Rated Steady-State Power	For 1200 W Power Supply:	800 W (at 100 VAC), 900 W (at 120 VAC), 1200 W (at 200 to 240 VAC)
		For 750 W Power Supply:	750 W (at 100 to 120 VAC), 750 W (at 200 to 240 VAC)
		For 460 W Power Supply:	460 W (at 100 to 120 VAC), 460 W (at 200 to 240 VAC)
	Maximum Peak Power	For 1200 W Power Supply:	800 W (at 100 VAC), 900 W (at 120 VAC),

Technical Specifications - HP 3PAR StoreServ File Controller

			1200 W (at 200 to 240 VAC)
		For 750 W Power Supply:	750 W (at 100 to 120 VAC),
			750 W (at 200 to 240 VAC)
		For 460 W Power Supply:	460 W (at 100 to 120 VAC),
			460 W (at 200 to 240 VAC)
System Inlet Temperature	Operating	10° to 35°C (50° to 95°F) at sea level with an altitude derating of 1.0°C per every 304.8 m (1.8°F per every 1000 ft) above sea level to a maximum of 3048 m (10,000 ft), no direct sustained sunlight. Maximum rate of change is 10°C/hr (18°F/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 30°C (86°F).	
	Non-operating	-30° to 60°C (-22° to 140°F). Maximum rate of change is 20°C/hr (36°F/hr).	
Relative Humidity (non-condensing)	Operating	10% to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing.	
	Non-operating	5% to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing.	
Altitude	Operating	3048 m (10,000 ft). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	
	Non-operating	9144 m (30,000 ft). Maximum allowable altitude change rate is 457 m/min (1500 ft/min).	
Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). The listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels. **NOTE:** The Listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels.		
	Idle		
	LWAd	4.1 B	
	LpAm	25 dBA	
	Operating		
	LWAd	4.3 B	
	LpAm	27 dBA	
Emissions Classification (EMC)	FCC Rating	Class A	
	Normative Standards	CISPR 22; EN55022; EN55024; FCC CFR 47, Pt 15; ICES-003; CNS13438; GB9254; K22;K24; EN 61000-3-2; EN 61000-3-3; EN 60950-1; IEC 60950-1	
	NOTE: Product conformance to cited product specifications is based on sample (type) testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements. **NOTE:** The Listed sound levels apply to standard shipping configurations. Additional options may result in increased sound levels.		

Technical Specifications - HP 3PAR StoreServ File Controller

HP iLO 4 On System Management	**Architecture**	PCI Express based health and remote management ASIC
	Processor	Embedded ARM processor core operating at 400MHz
	Upgradeability	Firmware upgradeable via Flash ROM
	Video Support	1920 x 1200 (16 bpp) DVR max resolution
	Interfaces	HP iLO Dedicated* Network connection (10/100/1000 Mb/s) on rack, tower and SL systems *Optional Module on some servers HP iLO Shared Network connection (10/100/1000 Mb/s) on rack, tower and SL systems HP iLO network connection to blades (100 Mb/s) to Onboard Administrator (with 10/100/1000 Mb/s uplink) on blade systems
	Memory	16 MB Flash 256 MB DDR 3 with ECC (112 MB after ECC and video)
	Operating System Support	For information on HP's Certified and Supported ProLiant Servers for OS and Virtualization Software and latest listing of software drivers available for your server including how to purchase from HP, please visit our OS Support Site at: http://www.hp.com/go/ossupport
	Client System Support	For information on Client System Support, please visit the HP iLO Feature Comparison Site at: www.hp.com/go/compareilo
	Client Browser Support	Microsoft Internet Explorer 9 **NOTE:** For customers using Protected Mode, please use the Java based version of Integrated Remote Console. Microsoft Internet Explorer 8 **NOTE:** For customers using Protected Mode, please use the Java based version of Integrated Remote Console. Microsoft Internet Explorer 7 Firefox Extended Support Release (ESR) 10 (on supported Windows and Linux systems Firefox 3.6 (on supported Windows and Linux systems)
	Command Line Support	Secure Shell and serial port access Secure Socket Layer Secure Shell version 2
	Security	Advanced Encryption Standard (AES) and Triple Data Encryption Standard (3DES) on browser, CLP and XML scripting interface AES encryption of video RC4 encryption of video
	Directory Support Services	Active Directory v1.0 (Windows 2003)
	Driver Support	HP ProLiant iLO 4 Management Controller Driver Package
	Management protocols supported	SNMP, IPMI 2.0 (system and LAN interface), DMTF Systems Management Architecture for Server Hardware Command Line Protocol (SMASH CLP), HP RIBCL XML

Technical Specifications - HP 3PAR StoreServ File Controller

HP Smart Array P420i Controller	**Dimensions**	Embedded
	Disk Drive and Enclosure Interface - Transfer Rate	6Gb/s SAS (Serial Attached SCSI) 3Gb/s SATA (Serial ATA)
	SAS Connectors	2 internal 4X connectors
	Cache Memory Speed	512MB FBWC - DDR3-1333MHz with 40-bit wide bus, 1GB or 2GB FBWC DDR3-1333MHz with 72-bit wide bus
	Server Interface	x8 PCIe 3.0 provides 8GB/s maximum bandwidth
	SAS Speed	(8) 6Gb/s SAS links provide 4.8GB/s maximum bandwidth
	Cache Memory	Zero Memory RAID has no cache memory 40-bit 256MB ECC protected cache (battery upgrade available) 72-bit 512MB BBWC or 72-bit 512MB and 1G FBWC
	Logical Drives Supported	Zero Memory, Up to 2 logical volumes (8SFF or 4LFF physical drives) Up to 64 logical drives with cache
	Host Memory Addressing	64-bit, supporting greater than 4GB server memory space

HP Ethernet 1Gb 4-port 331FLR Adapter	**HP Flexible Network Technology**	HP Flexible Network Technology consists of replaceable network solutions to meet the customers require now or in the future.	
	Network Interface	10Base-T/100Base-TX/1000Base-TX	
	Compatibility	EEE 802.3 10Base-T	
		IEEE 802.3ab 1000Base-T	
		IEEE 802.3u 100Base-TX	
		IEEE 802.3ad 1000Base-TX	
		IEEE 802.1p 100Base-TX	
		IEEE 802.1q 100Base-TX	
	Data Transfer Method	PCI Express, four lanes (x4)	
	Chipset	BCM5719	
	Network Transfer Rate	10Base-T (Half-Duplex)	10 Mb/s
		10Base-T (Full-Duplex)	20 Mb/s
		100Base-TX (Half-Duplex)	100 Mb/s
		100Base-TX (Full-Duplex)	200 Mb/s
		1000Base-TX (Half and Full-Duplex)	2000 Mb/s
	Connector	Two RJ-45	
	Cable Support	10Base-T	Categories 3, 4 or 5 UTP; up to 328 ft (100 m)
		10/100/1000Base-TX	Category 5 or higher UTP; up to 328 ft (100 m)

Technical Specifications - HP 3PAR StoreServ File Controller

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For drives, 1 TB = 1 trillion bytes. Actual formatted capacity is less.